REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated September 28, 2004. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 3, 5-7, 14-15, and 23 are under consideration in this application. Claims 3, 5-7, 14-15, and 23 are being amended, as set forth above, in order to more particularly define and distinctly claim Applicants' invention. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Formality Rejection

Claim 15 was objected to for a minor error. Applicants respectfully point out that the error was contained in claim 23, rather than claim 15, and is being corrected as suggested by the Examiner. Claims 3, 5-7, 14, 15 and 23 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for the recitation of "memorizing means," "setting a viewpoint," and "in a particular display format." As indicated, the claims have been amended as suggested or required by the Examiner. Accordingly, the withdrawal of the outstanding informality rejections is in order, and is therefore respectfully solicited.

Allowable Subjected Matter

The Examiner withdrew the prior art rejections against claims 5-7, 14, 15 and 23, and these claims were only rejected under 35 U.S.C. § 112, second paragraph. As these claims have been amended to overcome the 112 rejections, they are in condition for allowance.

Prior Art Rejections

Claim 3 remained rejected under 35 U.S.C. § 102(b) as being anticipated by the article of Hartenstein et al., *Trends in Genetics,* 1995 ("Hartenstein"). This rejection has been carefully considered, but is most respectfully traversed.

The method for displaying a gene expression phenomenon in one or more living organisms (e.g., p. 3, line 3: human; p. 13, last line: Ascidian/sea squirt[1]) in a system comprising a database that memorizes, for each cell or each site (e.g., "*a lung or a liver*" p. 16, line 22) of said living organisms along a time axis, data indicative of a shape of said cell or site and expression data associated with a degree of expression of the gene expression phenomenon in said cell or site along a time axis; and processing means adapted to obtain said data indicative of the shape and expression data that are memorized in said database to visualize and display the gene expression phenomenon on a display screen, as now recited in claim 3, comprising: a first step of displaying as a three-dimensional image on the display screen a shape of said living organisms of which the gene expression phenomenon is observed; a second step of setting a viewpoint by a user via a keyboard 202 or a mouse 203 (Fig. 2; "*the keyboard 202 or the mouse 203 associated with the computer 201 may be used to designate a site of a living matter, designate a cell, or the designate the viewpoint of an observer*" p. 38, 2nd full paragraph) on a three-dimensional space where the gene expression phenomenon in said living organisms displayed is to be observed; and a third step of reading the gene expression data of said cell or site of said living organisms out of said database, creating a plurality of three-dimensional images representing the gene expression phenomenon at the viewpoint set at said second step or at a fixed viewpoint, to display at least one of said three-dimensional images in multiple tones using one color or multiple colors, each of the tones corresponding to a degree of expression of the gene expression phenomenon.

In particular, simulating ("*the present invention is implemented to simulate development of an organism*" p.12, lines 17-18; "*simulates development of fertilized eggs*" p. 37, line 2; "*"IntelligentBox" on which installed are a biological simulation program 2012 and a DB access program 2013 for accessing the gene DB 205*" p. 15,

[1] AHox1 is an Ascidian (*Halocynthia roretzi/* sea squirt) homeobox gene; AMD1 is an Ascidian gene developed into body wall muscle in adult stage; and As-T is an ascidian homologue (As-T) of the mouse T gene.

lines 7-9) and chronologically displaying a change in shape of said cell or site of said living organisms caused by an external stimulation (p. 37, lines 7-8; Fig. 37) artificially incurred according to a planned experiment ("*the result of a planned experiment on a life form, rather than natural phenomena, can be visualized*" "*by altering the parameters*" p. 2, 1st paragraph of the previously submitted 132 declaration) **and** a change in shape of a cell or site caused by internal activities of said cell or site of said living organisms; and displaying an animation of a three-dimensional image representing the gene expression phenomenon from a certain viewpoint at a certain instant of time.

The biological simulation program 2012 uses the DB access program 2013 to assess the database ("*experimentally observed data*" p. 1, last paragraph)") and to create a mathematical model of a gene expression phenomenon in one or more living organisms, to visualize "simulated experiments" by extracting specific conditions from across the database resulting from observation and prior experiments under natural and artificially stimulated conditions. The invention shows how the gene expression phenomenon develops and, by changing variables, such as adding an external stimulation artificially incurred according to a planned experiment, make predictions about how the gene expression phenomenon will change. The invention enables three-dimensional visualization of the movement of specified gene groups by extraction in accordance with specific conditions from a database accumulated under various conditions, e.g., an external stimulation such as thermal change, environment composition change, addition of inorganic or organic chemical materials from outside, electrical stimulation, or miRNA (micro RNA that peculiarly inhibits the expression of a target gene). As shown in Fig, 28, "*the change in shapes of sites 2802, 2803, 2804, and 2805 is displayed along the time axis when the external simulation is applied to a living matter 2801 at the position designated by an arrow P* (p. 34, last 4 lines of the paragraph beginning with Fig. 28)." As another example, when the database only contains the data of a first experiment involving an external stimulation A and the data of a second experiment involving an external stimulation B, the invention can simulates the change as if both external stimulation A and B were applied.

"Details of the IntelligentBox can be found in,.... Yoshihiro Okada and Yuzuru Tanaka, "Collaborative Environments of IntelligentBox for Distributed 3D Graphic Applications", Proceedings of the Computer Animation '97, IEEE Computer Society. Since processing and display of the three-dimensional graphics herein are completely

based on the IntelligentBox system in this example, description about the process is omitted in this embodiment section (p. 15, lines 9-27)." An IDS of the four references are being concurrently filed with this response.

As described in the 1997 article, IntelligentBox provides a constructive visual software development system for interactive 3D graphic applications, which represents any objects as reactive 3D visual objects, which are called Boxes that can be manually combined with other Boxes. It provides a uniform framework for the concurrent definition of both geometrical compound structures among Boxes and their mutually interactive functional linkages. A collaborative environment is introduced as a function of a particular Box called a RoomBox for distributed 3D graphic applications. Multiple RoomBoxes on different computers share specific user-operation events with each other. An application example in Fig. 4 shows a composite box of a motor and tires.

In short, the invention provides a database interface which simulates and visualizes virtual experiments to prompt a user to come up with new knowledge and findings.

Applicants contend that Hartenstein fails to teach or suggest "simulating and chronologically displaying a change in shape of said cell or site of said living organisms caused by an external stimulation artificially incurred according to a planned experiment" as the invention.

The present invention simulates and displays the simulated result of planned experiments on a life form, such as during embryogenesis, rather than just faithfully displaying natural biological phenomena or animations of embryogenesis as Hartenstein. The invention predicts development of planned experiments on a life form by creating an approximate (mathematical) model and applying existing data to IntelligentBox. Hartenstein merely imitates representation of a natural embryogenesis process. In other words, the present invention provides a novel means to simulate and visualize the simulated results based upon existing data regarding applying artificial conditions to a living organism, which is not disclosed in Hartenstein.

Although the invention applies the general mechanism of IntelligentBox, the invention applies IntelligentBox to display a gene expression phenomenon in a cell or a site of one or more living organisms, to achieve unexpected results or properties. For example, to visualize "simulated experiments" under natural and artificially stimulated conditions for gene expression in a cell or a site of one or more living organisms. The

presence of these unexpected properties is evidence of nonobviousness. MPEP§716.02(a).

> "Presence of a property not possessed by the prior art is evidence of nonobviousness. In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963) (rejection of claims to compound structurally similar to the prior art compound was reversed because claimed compound unexpectedly possessed anti-inflammatory properties not possessed by the prior art compound); Ex parte Thumm, 132 USPQ 66 (Bd. App. 1961) (Appellant showed that the claimed range of ethylene diamine was effective for the purpose of producing " 'regenerated cellulose consisting substantially entirely of skin' " whereas the prior art warned "this compound has 'practically no effect.' ").

Although "[t]he submission of evidence that a new product possesses unexpected properties does not necessarily require a conclusion that the claimed invention is nonobvious. In re Payne, 606 F.2d 303, 203 USPQ 245 (CCPA 1979). See the discussion of latent properties and additional advantages in MPEP § 2145," the unexpected properties were unknown and non-inherent functions in view of the IntelligentBox references, since they do not inherently achieve the same results. In other words, these advantages would not flow naturally from following their teachings, since they fail to suggest applying IntelligentBox to display a gene expression phenomenon in a cell or a site of one or more living organisms. At most, IntelligentBox was used to animate a shark in Fig. 11 (p. 120) and an insect in Fig. 13 (p. 121) in the 1995 reference.

None of the IntelligentBox references teaches or suggests applying IntelligentBox to simulate a gene expression phenomenon in a cell or a site of one or more living organisms caused by an external stimulation artificially incurred according to a planned experiment. There is no teaching or suggestion to combine IntelligentBox with Hartenstein.

Even if, arguendo, one skilled in the art were motivated to combine IntelligentBox with Hartenstein, such combined teachings would still fall short in fully meeting the Applicants' claimed invention as set forth in claim 1 since, as discussed, there is no teaching of "simulating and chronologically displaying a change in shape of said cell or

site of said living organisms caused by an external stimulation artificially incurred according to a planned experiment" in either IntelligentBox or Hartenstein.

Applicants further contend that the mere fact that one of skill in the art could combine IntelligentBox with Hartenstein to meet the terms of the claims is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for one skilled in the art to provide the unexpected properties, such as to visualize "simulated experiments" under natural and artificially stimulated conditions for gene expression in a cell or a site of one or more living organisms, without the benefit of appellant's specification, to make the necessary changes in the reference device. Ex parte Chicago Rawhide Mfg. Co., 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984). MPEP§2144.04 VI C.

Applicants contend that neither the cited references, nor their combination teaches or discloses each and every feature of the present invention as disclosed in independent claim 3. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

Conclusion

In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references upon which the rejections in the Office Action rely, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

Respectfully submitted,

Stanley P. Fisher
Registration Number 24,344

Juan Carlos A. Marquez
Registration Number 34,072

REED SMITH LLP
3110 Fairview Park Drive
Suite 1400
Falls Church, Virginia 22042
(703) 641-4200

December 17, 2004
SPF/JCM/JT